

* NOTICES

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

1. In parallel with the direction of X in the 2nd position from a slideway which extends in parallel with the direction of Y in parallel with the direction of X, and the 1st position, And it can move in the direction of Y square, respectively, and describes above. The 1st article holder and the 2nd article holder which are guided in a slideway top, respectively, , such as this A movement system which moves 1 article holder and the 2nd article holder on said slideway In a positioning device which it has, Said 1st article holder and the 2nd article holder The 1st mobile unit that can be connected by turns, It is move cis- [said] about the 2nd mobile unit. Tem has and said 1st mobile unit from said 1st position. To the mid-position between this 1st position and 2nd position, said 1st article holder, And the 2nd article holder is moved. It is suitable for that of ** and said 2nd mobile unit is in said 2nd position from said mid-position. Are suitable for moving said 1st article holder and the 2nd article holder. A positioning device by which it is characterized.
2. Each aforementioned mobile unit is provided with one X motor and two Y motors, and is said X. The 1st portion that extends in parallel with said direction of X as for a motor, Into the 1st portion of this X motor It meets, and it can move and can connect with said 1st article holder and the 2nd article holder by turns. The 1st portion that has the 2nd portion and extends in parallel with said direction of Y as for the two Y motors aforementioned each , the 2nd portion that can move along with this 1st portion of related Y motor -- an owner -- A mobile unit in which it carries out and said 1st portion of X motor of each aforementioned mobile unit is related A claim connecting with said 2nd portion of said two Y motors A positioning device given in the paragraph 1.
3. It is movable in parallel with said direction of Y, and they are parallel to said direction of X said direction of X, and . So that it may be pivotable around axis of rotation which extends at right angles to the direction of ** Y, this positioning -- a device -- a common balance unit

guided to a base -- said two movements -- uni--- said 1st portion of Y motor of TTO was connected -- being according to claim 2 -- A positioning device.

4. Base part which is guided on said slideway and may be connected with said mobile unit, Seki It moves to said base part by an actuator unit of an article holder which carries out a ream. A positioning device given in any 1 paragraph of claims 1-3, wherein each aforementioned article holder is provided with a material table which can be carried out.

5. It is in said direction of X, and the direction of Y in parallel with said direction of Y in parallel with said direction of X. Said material table of each aforementioned article holder is described above in parallel with a Z direction which extends vertically. Make it movable to a base part, and. The 1st rotation that extends in parallel with said direction of X An axis and the 2nd rotating shaft line which extends in parallel with said direction of Y, It is in parallel with said Z direction. It is said BE about said material table of each aforementioned article holder to the surroundings with the 3rd rotating shaft line which carries out **. The positioning according to claim 4 constituting rotatable to - SU part A device.

6. The radiation source.

A mask holder and a principal axis.

It is the RISOGURAFU device provided with the above, and said positioning device of this RISOGURAFU device is a positioning device given in any 1 paragraph of said claims 1-5, This position. Each article holder of an arrangement device is a substrate holder of this RISOGURAFU device, and it is said article. Said 1st position of a holder is a characteristic-ized position which exists to said characteristic-ized unit closely. It is characterized by things.

[Translation done.]

* NOTICES

JP0 and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention

Positioning device which has two article holders The slideway which extends in parallel with the direction of Y in parallel with the direction of X as for this invention, The 1st article holder and the 2nd article holder which can move in the direction of Y in parallel with the direction of X from the 1st position in the 2nd position square, respectively, and are guided in a slideway top, respectively, It is related with a positioning device provided with the movement system which moves the 1st article holders, such as this, and the 2nd article holder on a slideway.

The convergence unit in which this invention has a principal axis with the radiation source and a mask holder, The slideway which is a RISOGURAFU device provided with a characteristic-ized unit and a positioning device, and extends in parallel with this direction of X, and the direction vertical to the above-mentioned principal axis of Y in parallel with the direction vertical to the above-mentioned principal axis of X, The 1st substrate holder and the 2nd substrate holder movable parallel respectively in the direction of Y parallel to the direction of X in the 2nd position near the above-mentioned convergence unit from the 1st position and which are guided on this slideway, respectively, It is related with the RISOGURAFU device with which a positioning device is provided with the movement system which moves the 1st substrate holder and the 2nd substrate holder on the above-mentioned slideway.

The positioning device and RISOGURAFU device of the kind stated to the first paragraph are known from the European Patent public presentation No. 0687957. This known RISOGURAFU device is used for exposure of the semiconductor base material in the manufacturing process of an integrated semiconductor circuit, and is operating according to what is called a step Andre PITO process. Since this known positioning device moves a semiconductor base material to a characteristic-ized unit as opposed to a convergence unit, it is used for this known RISOGURAFU device. The 1st position of this known positioning device is a loading removing position which loads a semiconductor base material into the 1st article holder or the 2nd article

holder, or can remove a semiconductor base material. The 2nd position of this positioning device is an exposure position which can expose the semiconductor base material on the 1st article holder or the 2nd article holder via a convergence unit. With the movement system of the positioning device which is not explained to the European Patent public presentation No. 0687957 in detail, the 1st article holder and the 2nd article holder can be located [2nd] from the 1st position, and can be moved to this reverse from the 2nd position at the 1st position. While the semiconductor base material which the 1st article holder is in the 2nd position, and is on the 1st article holder is being exposed, the 2nd article holder is in the 1st position, and the following semiconductor base material is first loaded on this 2nd article holder. Next, the 2nd article holder moves to a characteristic-ized position from the 1st position, and the semiconductor base material which is on the 2nd article holder in this characteristic-ized position is characteristic-ized with a characteristic-ized unit. When the 2nd article holder is in a characteristic-ized position, the 1st article holder and the 2nd article holder are close, and are moved. Thus, exposure of the semiconductor base material on the 1st article holder and characteristic-ization of the semiconductor base material on the 2nd article holder are performed simultaneously, therefore that of the output of a device based on this step ANDORE peat principle are high.

The fault of this known positioning device and this known RISOGURAFU device, As mentioned above, in order are close and to move the 1st article holder and the 2nd article holder, it is being unable to perform mutually characteristic-izing of the semiconductor base material on the 2nd article holder, and exposure of the semiconductor base material on the 1st article holder independently. As a result, exposure of the semiconductor base material on the 1st article holder cannot be started until the 2nd article holder reaches a characteristic-ized position.

The purpose of this invention the 1st process of including a series of 1st positioning process of the 1st article holder, Simultaneously with the 2nd process of including a series of 2nd positioning process of the 2nd article holder. It is in obtaining the positioning device of the form indicated to the first paragraph that can carry out independently from the 2nd process, and can carry out this 1st process about the 2nd article holder, and can carry out the 2nd process independently simultaneously about the 1st article holder.

Other purposes of this invention the characteristic-ized process of including a series of 1st positioning process of the 1st substrate holder, Simultaneously with an exposure process including a series of 2nd positioning process of the 2nd substrate holder. It is in obtaining the RISOGURAFU device of the form indicated to the 2nd paragraph that can carry out independently, and can carry out a characteristic-ized process about the 2nd substrate holder, and can carry out an exposure process independently simultaneously about the 1st substrate holder.

The 1st mobile unit in which this invention positioning device can connect said 1st article holder and the 2nd article holder by turns for this purpose, Said movement system is provided with the 2nd mobile unit, and said 1st mobile unit from said 1st position. It is suitable for moving said 1st article holder and the 2nd article holder to the mid-position between this 1st position and 2nd position, and said 2nd mobile unit is suitable for moving said 1st article holder and the 2nd article holder to said 2nd position from said mid-position. As a result of using said 1st mobile unit and the 2nd mobile unit, the 1st process of including a series of 1st positioning process of the 1st article holder, with the 1st mobile unit in the 1st position. It can carry out and, simultaneously with the 1st process, the 2nd process of including a series of 2nd positioning process of the 2nd article holder can be independently carried out in the 2nd position with the 2nd mobile unit. When the 1st process and the 2nd process are completed, the 1st article holder is moved to the mid-position from the 1st position with the 1st mobile unit, and the 2nd article holder is moved to the mid-position from the 2nd position with the 2nd mobile unit. In the mid-position, separate the 1st article holder from the 1st mobile unit, and it connects with the 2nd mobile unit, and the 2nd article holder is separated from the 2nd mobile unit, and it connects with the 1st mobile unit. Next, the 1st article holder is moved to the 2nd position from the mid-position with the 2nd mobile unit, and the 2nd article holder is moved to the 1st position from the mid-position with the 1st mobile unit. Next, in the 1st position, the 1st process can be carried out about the 2nd article holder, and the 2nd process can be simultaneously carried out about the 1st article holder in the 2nd position independently. As a result of using said two mobile units, the distance to which the mobile unit of each each must move an article holder decreases, therefore the required size of a mobile unit decreases. It is not necessary to make it the structure which the movable portion of the 1st mobile unit and the movable portion of the 2nd mobile unit may pass mutually, therefore structure of a mobile unit can be simplified comparatively.

The positioning device of a RISOGURAFU device of this invention RISOGURAFU device is this invention positioning device because of this purpose.

Each article holder of this positioning device is a substrate holder of this RISOGURAFU device, and said 1st position of said article holder is characterized by being a characteristic-ized position which exists to said characteristic-ized unit closely.

In the 1st position as a result of using this invention positioning device for this invention RISOGURAFU device, the characteristic-ized process of including a series of 1st positioning process of the 1st substrate holder, It can carry out with the 1st mobile unit of a positioning device, and, simultaneously with the 1st process, an exposure process including a series of 2nd positioning process of the 2nd substrate holder can be independently carried out in the 2nd position with the 2nd mobile unit of a positioning device. The 1st process can be carried out about the 2nd substrate holder in the 1st position, and the 2nd process can be

simultaneously carried out about the 1st article holder in the 2nd position independently.

The special example of this invention positioning device each aforementioned mobile unit One X motor, The 1st portion that is provided with two Y motors and extends in parallel with said direction of X as for said X motor, The 1st portion that has the 2nd portion that can be moved along with the 1st portion of this X motor, and can be connected with said 1st article holder and the 2nd article holder by turns, and extends in parallel with said direction of Y as for the two Y motors aforementioned [each], It has the 2nd portion that can move along with this 1st portion of related Y motor, and said 1st portion of X motor of each aforementioned mobile unit is connected with said 2nd portion of said two Y motors of a related mobile unit. Since the 1st portion of X motor of each mobile unit is connected with the 2nd portion of two Y motors of a related mobile unit, the comparatively rigid stable base material of X motor by two Y motors is obtained, and there is an advantage which raises the positioning accuracy of a mobile unit by this. The moving range from the 1st position of the 1st mobile unit to the mid-position is limited, Since the moving range from the mid-position of the 2nd mobile unit to the 2nd position is limited, four Y motors of two mobile units can be arranged to two rows, and, as a result, a positioning device can be made into a compact and easy structure.

Other examples of this invention positioning device are movable in parallel with said direction of Y in parallel with said direction of X, Said 1st portion of Y motor of said two mobile units was connected with the common balance unit guided to the base of this positioning device so that it might be pivotable around axis of rotation which extends at right angles to said direction of X, and the direction of Y. Since the 1st portion of Y motor of a mobile unit is connected with said common balance unit, The reaction force of X motor of a mobile unit and Y motor is conducted to a balance unit via the 1st portion of Y motor, and this reaction force is changed into movement of a balance unit parallel to the direction of Y parallel to the direction of X and, and rotation of the balance unit to the surrounding base of said axis of rotation. Thus, conduction of the reaction force to a base, a slideway, and an article holder is prevented as much as possible, therefore the positioning accuracy of a positioning device improves further. Other examples of this invention positioning device are guided on said slideway, and each aforementioned article holder is provided with the material table which can move to said base part by the actuator unit of the article holder relevant to the base part which may be connected with said mobile unit. In this example of a positioning device, the material table of an article holder is moved in comparatively low accuracy with a mobile unit covering a comparatively long distance, and a material table is moved in comparatively high accuracy covering a comparatively short distance by said actuator unit. Thus, a mobile unit can be made into the thing of the comparatively easy usual form, and it can be necessary to make the size of an actuator unit possible the most exact.

The special example of this invention positioning device in parallel with said direction of Y in

parallel with said direction of X, In parallel with the Z direction which extends at right angles to said direction of X, and the direction of Y, make movable said material table of each aforementioned article holder to said base part, and. Said material table of each aforementioned article holder was constituted rotatable to said base part around the 1st rotating shaft line which extends in parallel with said direction of X, the 2nd rotating shaft line which extends in parallel with said direction of Y, and the 3rd rotating shaft line which extends in parallel with said Z direction. Thus, adjustment of a material table can be highly enabled to a base part.

Next, with reference to an accompanying drawing, this invention is explained much more in detail.

Drawing 1 shows this invention RISOGURAFU device in diagram.

Drawing 2 is a diagram top view of the 1st example of this invention positioning device which uses and fits the RISOGURAFU device of drawing 1.

Drawing 3 shows the positioning device of drawing 2 in the state where there are two substrate holders of a positioning device in the mid-position.

Drawing 4 is a diagram top view of the 2nd example of this invention positioning device which uses and fits the RISOGURAFU device of drawing 1.

this invention RISOGURAFU device shown in drawing 1 in diagram is used in the manufacturing process of an integrated semiconductor circuit for exposure of a semiconductor base material, and this RISOGURAFU device is an order parallel to a vertical Z direction, It has this invention positioning device 3, the convergence unit 5, the mask holder 7, and the frame 1 that supports the radiation source 9. This RISOGURAFU device is an optical RISOGURAFU device, and that radiation source 9 has the light source 11. The mask holder 7 can be provided with the back face 13 which extends at right angles to a Z direction, and can install the mask 15 on this. The mask 13 has a pattern of an integrated semiconductor circuit, or sub patterns. The convergence unit 5 is an imaging system or a projection system, is provided with the optical lens system 17 which has the primary-optic-axis line 19 which extends in parallel with a Z direction, for example, has optical reduction percentage like 4 or 5. The positioning device 3 is provided with the 1st substrate holder 21, and this 1st substrate holder 21 and the 2nd same substrate holder 23. The substrate holders 21 and 23 are provided with the back faces 25 and 27 which extend at right angles to a Z direction, respectively. In the state which shows in drawing 1, the 1st semiconductor 29 is on the back face 25 of the 1st substrate holder 21, and the 2nd semiconductor base material 31 is on the back face 27 of the 2nd substrate holder 23. Although the positioning device 3 has the slideway 33, this slideway 33 extends in parallel with the direction vertical to a Z direction of level X, and it has extended in parallel with the direction of X, and the direction vertical to a Z direction of level Y. The substrate holders 21 and 23 are guided in the slideway 33 top,

respectively, and the substrate holders 21 and 23 can move them in the direction of X onto the slideway 33 in parallel with the direction of Y in parallel with the movement system 35 of the positioning device 3, respectively.

In the state which shows in drawing 1, the 1st substrate holder 21 is in the 2nd position of the positioning device 3 with the 1st semiconductor base material 29, and this 2nd position is equivalent to the exposure position of the RISOGURAFU device near the convergence unit 5. In this position, the optical beam produced from the light source 11 is guided through the mask 15, and converges on the 1st semiconductor base material 29 with the convergence unit 5, namely, focusing is carried out, and image formation of the pattern on the mask 15 is carried out to the 1st semiconductor base material 29 in the reduced size. The 1st semiconductor base material 29 is dramatically provided with many of each places, and carries out image formation of the same semiconductor circuit on places, such as this. The place of the 1st semiconductor base material 29 is exposed one by one via the mask 15 for this purpose. The exposure process used for the RISOGURAFU device of drawing 1 is what is called a step ANDORE peat exposure process, and by this process. During exposure of each place of the 1st semiconductor base material 29, the 1st semiconductor base material 29 and the mask 15 are in the fixed position to the convergence unit 5, and the next place of the 1st semiconductor base material 29 is brought to the prescribed position to a convergence unit after exposure of the place exposed first according to this process. That is, the 1st substrate holder 21 is moved in parallel with the direction of Y in parallel with the direction of X with the movement system 35 of the positioning device 3. This process can be repeated at a given degree of a different mask many times, and the complicated integrated semiconductor circuit which has a layer system can be manufactured.

In the state which shows in drawing 1, the 2nd substrate holder 23 is in the 1st position of the positioning device 3 with the 2nd semiconductor base material 31, and this 1st position is equivalent to the characteristic-ized position of a RISOGURAFU device. In the state of the graphic display, the first semiconductor base material thoroughly exposed via the mask 15 in the exposure position is removed from the 2nd substrate holder 23, and is transported to the tip part (not shown) of the semiconductor base material under manufacture. The 2nd semiconductor base material 31 shown in drawing 1 is the following semiconductor base material, and is a semiconductor base material which it is exactly taken up from the above-mentioned tip part of a semiconductor base material, is just going to be arranged on the 2nd substrate holder 23, and needs to be made to expose via the mask 15 after the 1st semiconductor base material 29. the characteristic-ized unit 37 of the RISOGURAFU device with which this is also supported by the frame 1 in this characteristic-ized position -- therefore, the 2nd semiconductor base material 31 is characteristic-ized. When the 2nd semiconductor base material 31 is characteristic-ized thoroughly and the 1st semiconductor base material 29

is exposed thoroughly, the 2nd substrate holder 23 with the 2nd semiconductor base material 31 with the movement system 35. It is made to move to an exposure position from a characteristic-ized position, and the 1st substrate holder 21 is moved to a characteristic-ized position from an exposure position with the movement system 35 with the 1st semiconductor base material 29. This characteristic-ized unit 37 is provided with a measurement system, and in order to measure the position of each place of the 2nd relative semiconductor base material 31 to the 2nd substrate holder 23, it uses this measurement system. Since positions, such as this, are already measured in the characteristic-ized position next, they can position each place of the 2nd semiconductor base material 31 to the convergence unit 5 in an exposure position by measuring the position of the 2nd substrate holder 23 to the convergence unit 5. Thus, in an exposure position, to the convergence unit 5, time required to position each place of a sequential semiconductor base material is remarkably short, it ends, and the quantity of production of a RISOGURAFU device is improved remarkably. Since the position of the place of each each of the 2nd semiconductor base material 31 must be measured in a characteristic-ized position, it makes the movement system 35 of the positioning device 3 perform movement of the 2nd substrate holder 23 with the 2nd semiconductor base material 31 in a characteristic-ized position. As a result of using the two same separate substrate holders 21 and 23, carry out the exposure process of the semiconductor base material in an exposure position, and simultaneously The removal process of a front semiconductor base material, Since the installation process and characteristic-ized process of the following semiconductor base material in a characteristic-ized position are carried out, the output of a RISOGURAFU device improves further.

As shown in drawing 2, the movement system 35 of the positioning device 3 is provided with the 1st mobile unit 39 and the 2nd mobile unit 41. The substrate holders 21 and 23 are provided with the legs 43 and 45 which provided the static gas bearing, respectively and which are supported in aerostatics. The related substrate holders 21 and 23 are guided on the slideway 33 with these foot 43 and 45. The slideway 33 constitutes the upper surface of the granite block 47 fixed to the frame 1 of a RISOGURAFU device. The substrate holders 21 and 23 are provided with the 1st joint member 49 and 51 and the 2nd joint member 53 and 55, respectively, and combine the substrate holders 21 and 23 with the joint member 57 of the 1st mobile unit 39, and the joint member 59 of the 2nd mobile unit 41 by turns by joint members, such as this, respectively. In the state which shows in drawing 2, the 1st substrate holder 21 is combined with the joint member 59 of the 2nd mobile unit 41, and the 2nd substrate holder 23 is combined with the joint member 57 of the 1st mobile unit 39. Instead, the 1st substrate holder 21 can be combined with the joint member 57 of the 1st mobile unit 39, and the 2nd substrate holder 23 can also be combined with the joint member 59 of the 2nd mobile unit 41. The joint members 49, 51, 53, 55, 57, and 59 can be made into the thing of form of itself

known like for example, a mechanical coupling member or an electronic machine joint member.

As shown in drawing 2, the 1st mobile unit 39 and the 2nd mobile unit 41 are provided with the linear X motors 61 and 63 of the known usual form, and the two linear Y motors 65, 67, 69, and 71 in itself, respectively. The X motors 61 and 63 are provided with the 2nd portion 77 and 79 that can move along with the 1st portion 73 and 75 of the X motors 61 and 63 relevant to the 1st portion 73 and 75 that extends in parallel with the direction of X, respectively. The 2nd portion 77 and 79 is provided with the joint members 57 and 59 of the related X motors 61 and 63. The Y motors 65, 67, 69, and 71 extend in parallel with the direction of Y, respectively. It has the 2nd portion 89, 91, 93, and 95 that can move along with the 1st portion 81, 83, 85, and 87 of the Y motors 65, 67, 69, and 71 relevant to the 1st portion 81, 83, 85, and 87. The X motor 61 of the 1st mobile unit 39 and the two Y motors 65 and 67 are mutually arranged in the shape of an H character, and the 1st end 97 of the 1st portion 73 of the X motor 61 and the 2nd end 99 are combined with the 2nd portion 89 of the Y motor 65, and the 2nd portion 91 of the Y motor 67, respectively. Similarly the X motor 63 of the 2nd mobile unit 41 and the two Y motors 69 and 71 are mutually arranged in the shape of an H character, The 1st end 101 of the 1st portion 75 of the X motor 63 and the 2nd end 103 are combined with the 2nd portion 93 of the Y motor 69, and the 2nd portion 95 of the Y motor 71, respectively.

In the state which shows in drawing 2, the 2nd substrate holder 23 is in the 1st position, i.e., a characteristic-ized position, and the characteristic-ized process of including a series of 1st positioning process of the 2nd substrate holder 23 is performed by the 1st mobile unit 39. Simultaneously, the 1st substrate holder 21 is in the 2nd position, i.e., an exposure position, and an exposure process including a series of 2nd positioning process of the 1st substrate holder 21 is performed by the 2nd mobile unit 41. Therefore, simultaneously with an exposure process, moreover, a characteristic-ized process can be independently carried out from an exposure process as a result of use with the 1st mobile unit 39 and the 2nd mobile unit 41. When the exposure process about the 1st substrate holder 21 and the characteristic-ized process about the 2nd substrate holder 23 are completed, the 1st substrate holder 21 with the 2nd mobile unit 41. It is made to move to mid-position M' between an exposure position and a characteristic-ized position from an exposure position, as shown in drawing 3, and the 2nd substrate holder 23 is moved to mid-position M" between an exposure position and a characteristic-ized position from a characteristic-ized position with the 1st mobile unit 39. In above-mentioned mid-position M' and M , it has dissociated from the joint member 59 of the 2nd mobile unit 41, and the 2nd joint member 53 of the 1st substrate holder 21 has separated the 1st joint member 51 of the 2nd substrate holder 23 from the joint member 57 of the 1st mobile unit 39. Next, as shown in drawing 3, the joint member 57 of the 1st mobile unit 39 is combined with the 1st joint member 49 of the 1st substrate holder 21, and the joint member 59

of the 2nd mobile unit 41 is combined with the 2nd joint member 55 of the 2nd substrate holder 23. Next, the 1st substrate holder 21 is moved to a characteristic-ized position from mid-position M' with the 1st mobile unit 39, the substrate which is on the 1st substrate holder 21 here is taken down, and the following substrate is arranged and characteristic-ized. this -- simultaneously -- the 2nd substrate holder 23 is independently moved to an exposure position from mid-position M'' with the 2nd mobile unit 41 with this, and the substrate which is on the 2nd substrate holder 23 here is exposed. The 1st mobile unit 39 Mid-position [from the 1st position, i.e., a characteristic-ized position, M', And are suitable for moving both substrate holders 21 and 23 to M'', The 2nd mobile unit 41 is suitable for moving both substrate holders 21 and 23 to an exposure position from mid-position M' and M , Since the distance to which each mobile units 39 and 41 must move the substrate holders 21 and 23 decreases, the required size of the mobile units 39 and 41 also decreases. As shown in drawing 2, it sees in parallel with especially the direction of Y, and the size of the Y motors 65, 67, 69, and 71 of the mobile units 39 and 41 decreases remarkably. By using the two mobile units 39 and 41, it becomes unnecessary to constitute so that the moving section, especially the X motors 61 and 63 of the movement system 35 may pass mutually, and, as a result, the movement system 35 can be made into a comparatively easy structure. By arranging the two X motors 61 and 63 and the four Y motors 65, 67, 69, and 71 in the shape of two an H character, It is stabilized comparatively rigidly by the related Y motors 65, 67, 59, and 71, the X motors 61 and 63 are supported, and there is an advantage which raises the positioning accuracy of the mobile units 39 and 41 by this. By seeing in parallel with the direction of Y, and limiting the moving range of the mobile units 39 and 41, It can make it possible to arrange the four Y motors 65, 67, 69, and 71 in two lines of the Y motors 65 and 69 and other two Y motors two 67 and 71, and, thereby, the positioning device 3 can be made into a compact and easy structure.

Drawing 4 shows the positioning device 105 of the 2nd example of this invention which uses and fits the RISOGURAFU device by this invention. Numerals same into the portion to which the positioning device 105 of the 2nd example corresponds to the positioning device 3 of the 1st example in drawing 2, drawing 3, and drawing 4

It carries out with and is shown. Henceforth, only the main points of difference between the positioning device 3 and the positioning device 105 are explained.

The substrate holders 21 and 23 of the positioning device 105 are provided with the base parts 107 and 109, respectively, and each base part is provided with the legs 43 and 45, the 1st joint member 49 and 51, and the 2nd joint member 53 and 55 of the related substrate holders 21 and 23 which are supported in aerostatics. The substrate holders 21 and 23 of the positioning device 105 are provided with the substrate tables 111 and 113, respectively, and each of this substrate table is provided with the back faces 25 and 27 of the related substrate holders 21 and 23. Each substrate holders 21 and 23 are provided with the actuator units 115 and 117

shown in drawing 4 in diagram, and by this actuator unit. The substrate tables 111 and 113 of the related substrate holders 21 and 23 are made movable to the base parts 107 and 109 of the related substrate holders 21 and 23.

In this positioning device 105 of the 2nd example of this invention, Each actuator units 115 and 117 are provided with the system of uncontacted low RENTSUKA power-TA of itself known, and are comparatively high accuracy by this system, In the direction parallel to the direction of X, a distance comparatively slight in a direction parallel to a direction parallel to the direction of Y and a Z direction is covered, Make movable the substrate tables 111 and 113 of the related substrate holders 21 and 23 to the base parts 107 and 109 of the related substrate holders 21 and 23, and. At an angle comparatively small around the 2nd rotating shaft line which extends by this system in parallel with the 1st rotating shaft line and the direction of Y which extend in parallel with the direction of X in comparatively high accuracy, and the 3rd rotating shaft line which extends in parallel with a Z direction. The substrate tables 111 and 113 of the related substrate holders 21 and 23 are made rotatable to the base parts 107 and 109 of the related substrate holders 21 and 23. Thus, each mobile units 39 and 41 constitute what is called a mobile unit of condensation and rarefaction, and by the X motors 61 and 63 and the Y motors 65, 67, and 69 of the mobile units 39 and 41. The substrate holders 21 and 23 are crossed to a comparatively big distance with the substrate tables 111 and 113, Can move in comparatively low accuracy and the substrate tables 111 and 113 by the actuator units 115 and 117 of the mobile units 39 and 41. To the base parts 107 and 109 of the substrate holders 21 and 23, it can move in comparatively high accuracy covering a comparatively slight distance, and can rotate at comparatively few angles with comparatively high accuracy. Thus, are comparatively easy in the X motors 61 and 63 and the Y motors 65, 67, 69, and 71, It can be made the ordinary thing of a cheap form, and it can be exact and many required sizes of the actuator units 115 and 117 which progressed, therefore as much cost as possible can be limited. As opposed to the convergence unit 5, adjustment of the substrate tables 111 and 113 can be highly enabled to the characteristic-ized unit 37 of a RISOGURAFU device by use of the actuator units 115 and 117 which were explained here.

As further shown in drawing 4, the 1st portion 81, 83, 85, and 87 of the Y motors 65, 67, 69, and 71 of the mobile units 39 and 41 of the positioning device 105 is being fixed to the balance unit 119 common to the two mobile units 39 and 41. This balance unit 119 was provided with the 1st beam 121 and the 2nd beam 123, and the 1st beam 121 has extended almost in parallel with the direction of Y, and The 1st portion 81 of the Y motor 65 of the 1st mobile unit 39, Are fixing to this 1st beam 121, and, on the other hand, the 2nd beam 123 has also extended the 1st portion 85 of the Y motor 69 of the 2nd mobile unit 41 almost in parallel with the direction of Y, and it The 1st portion 83 of the Y motor 67 of the 1st mobile unit 39, The 1st portion 87 of the Y motor 71 of the 2nd mobile unit 41 is adhered to this 2nd beam 123. By the

1st cross beam 125 and the 2nd cross beam 127, the 1st beam 121 and the 2nd beam 123 are connected mutually, the beams 121 and 123 and the cross beams 125 and 127 are arranged in a rectangle, and the granite block 47 which is supporting the slideway 33 is surrounded with this rectangle. As shown in drawing 4 in diagram, it is provided on the base 133 of the positioning device 105, On the separate slideway 131 which has extended in parallel also with the direction of Y in parallel in the direction of X, The 1st beam 121 of the balance unit 119 is guided by the static gas bearing 129, and it is shown to the 2nd beam 123 of the balance unit 119 to it by the static gas bearing 135 on the above-mentioned separate slideway 131.

Therefore, the balance unit 119 can be moved in the direction parallel to a direction parallel to the direction of X, and the direction of Y, and also it can be rotated around axis of rotation which extends in parallel with a Z direction. In an operation, through the X motors 61 and 63 and the Y motors 65, 67, 69, and 71, the reaction force of the actuator units 115 and 117 of the mobile units 39 and 41 to which it points in parallel with the direction of Y in parallel with the direction of X is told to the balance unit 119, and in parallel with the direction of X, And or, the reaction force of the X motors 61 and 63 of the mobile units 39 and 41 to which it points in parallel with the direction of Y is told to the balance unit 119 through the Y motors 65, 67, 69, and 71, The reaction force of the Y motors 65, 67, 69, and 71 of the mobile units 39 and 41 to which it points in parallel with the direction of Y in parallel with the direction of X is directly told to the balance unit 119. Since the balance unit 119 is guided by the static gas bearings 129 and 135 on the above-mentioned separate slideway 131, it, The above-mentioned reaction force is changed into comparatively slight movement of the balance unit 119 of a direction parallel to a direction parallel to the direction of X and or the direction of Y, and comparatively slight rotation of the surrounding balance unit 119 of the above-mentioned axis of rotation which extends in parallel with a Z direction nearly thoroughly. Thus, according to the above-mentioned reaction force, generate in the base 133 and to the granite block 47 of the RISOGURAFU device 105, and the substrate holders 21 and 23. Since the mechanical oscillation conducted on the frame 1 of a RISOGURAFU device is prevented as much as possible, the positioning accuracy of the movement system 35 of the positioning device 105 improves further.

The mobile unit of other forms can be used for this invention positioning device instead of the mobile units 39 and 41 used for the above-mentioned positioning devices 3 and 105. The mobile unit of a positioning device the material table which is provided with the single linear X motor of a long ***** or ** sake, and a single linear Y motor, and also is related in a related article holder as an alternative plan For example, a slight or sake, It can have an actuator which only comprises X Lorentz-force motor and Y low RENTSU motor.

This invention relates to the RISOGURAFU device which performs the exposure process by a step and scan principle. Such a RISOGURAFU device is provided with a separate positioning

device, and enables it to move a mask holder, for example to a scanning direction parallel to the direction of X with this positioning device. According to the step and scan process, the pattern which a mask and a semiconductor base material are not in a fixed position, and are moving to the scanning direction simultaneously to a convergence unit among an exposure process, therefore is on a mask is scanned.

Finally, this invention positioning device is not necessarily used only for a RISOGURAFU device, and can be used for other devices other than the RISOGURAFU device with which two material tables must moreover perform a series of positioning processes mutually independently simultaneously. There is other machinery which characteristic-izes first a processing machine, a machine tool, and the article that should be machined or processed to an article holder as the example in a characteristic-ized position, is machined in an actuated valve position, or is processed, or a device.

[Translation done.]

* NOTICES

JP0 and INPIT are not responsible for any
damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1

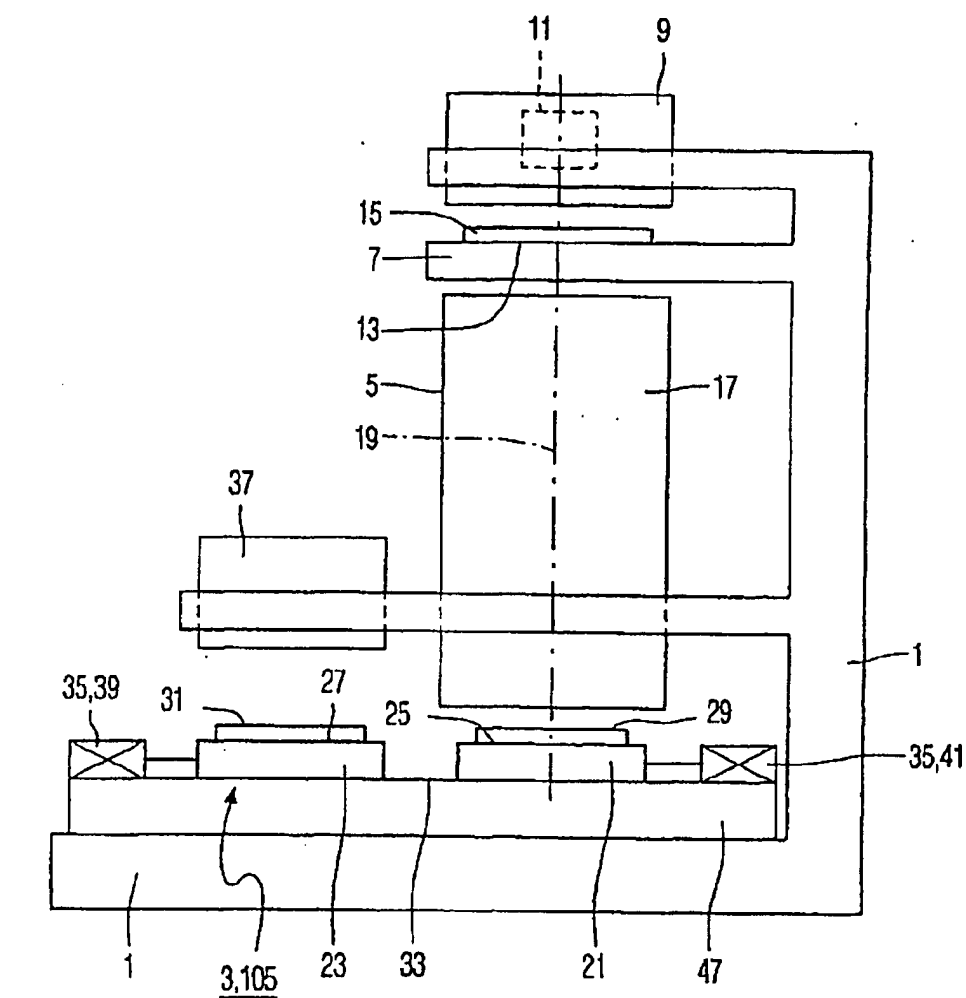


FIG. 1

[Drawing 2]

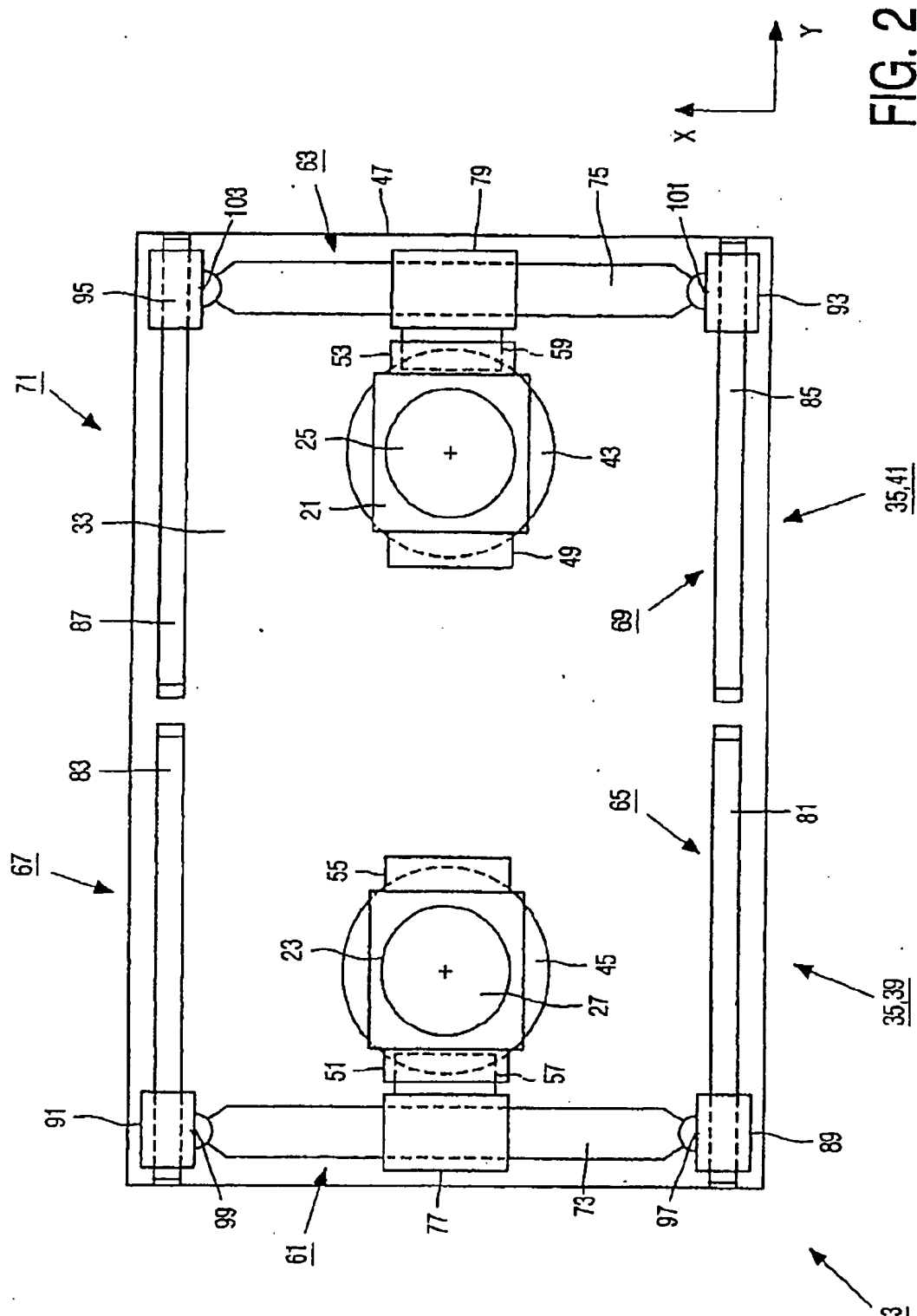
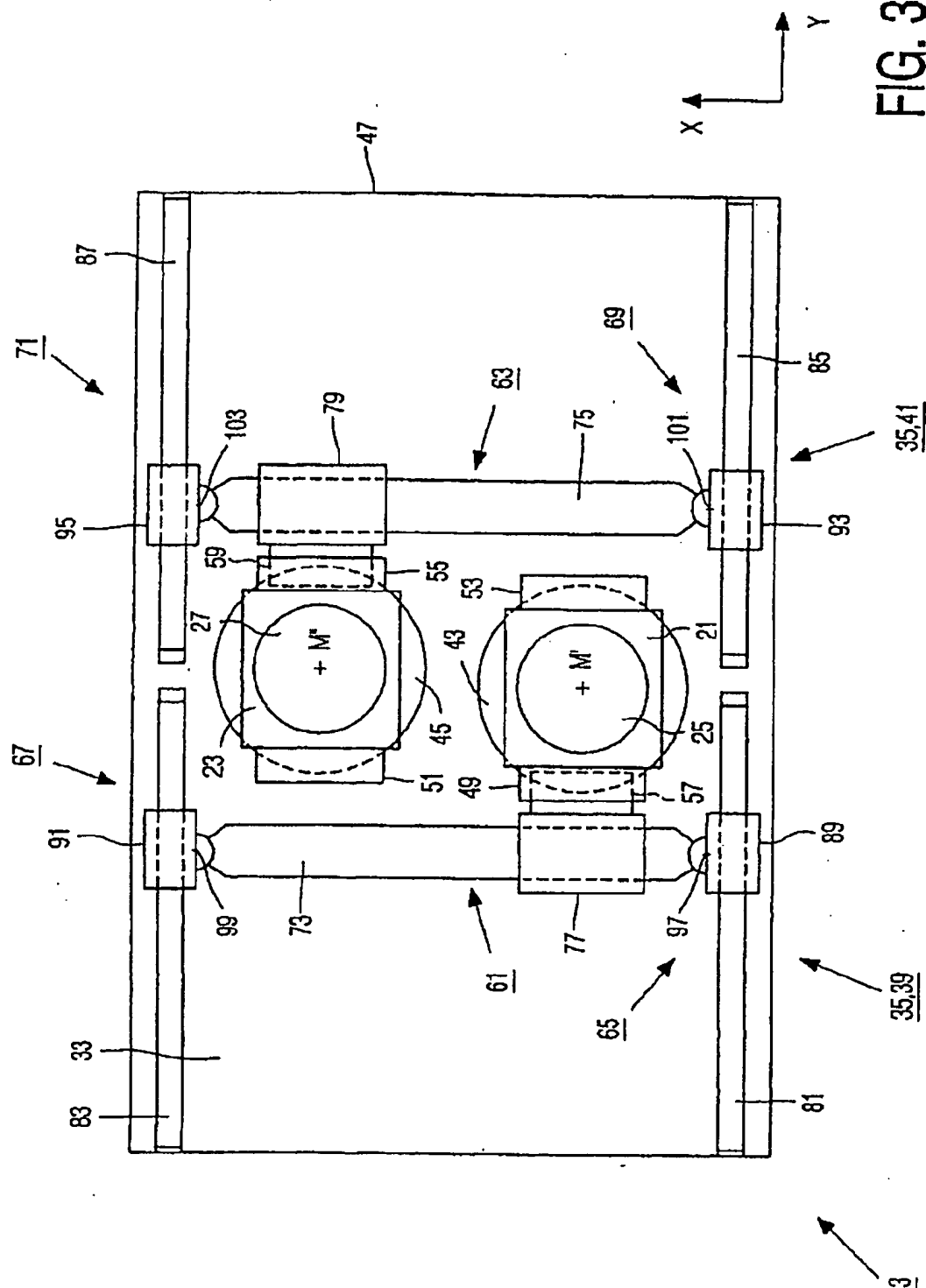


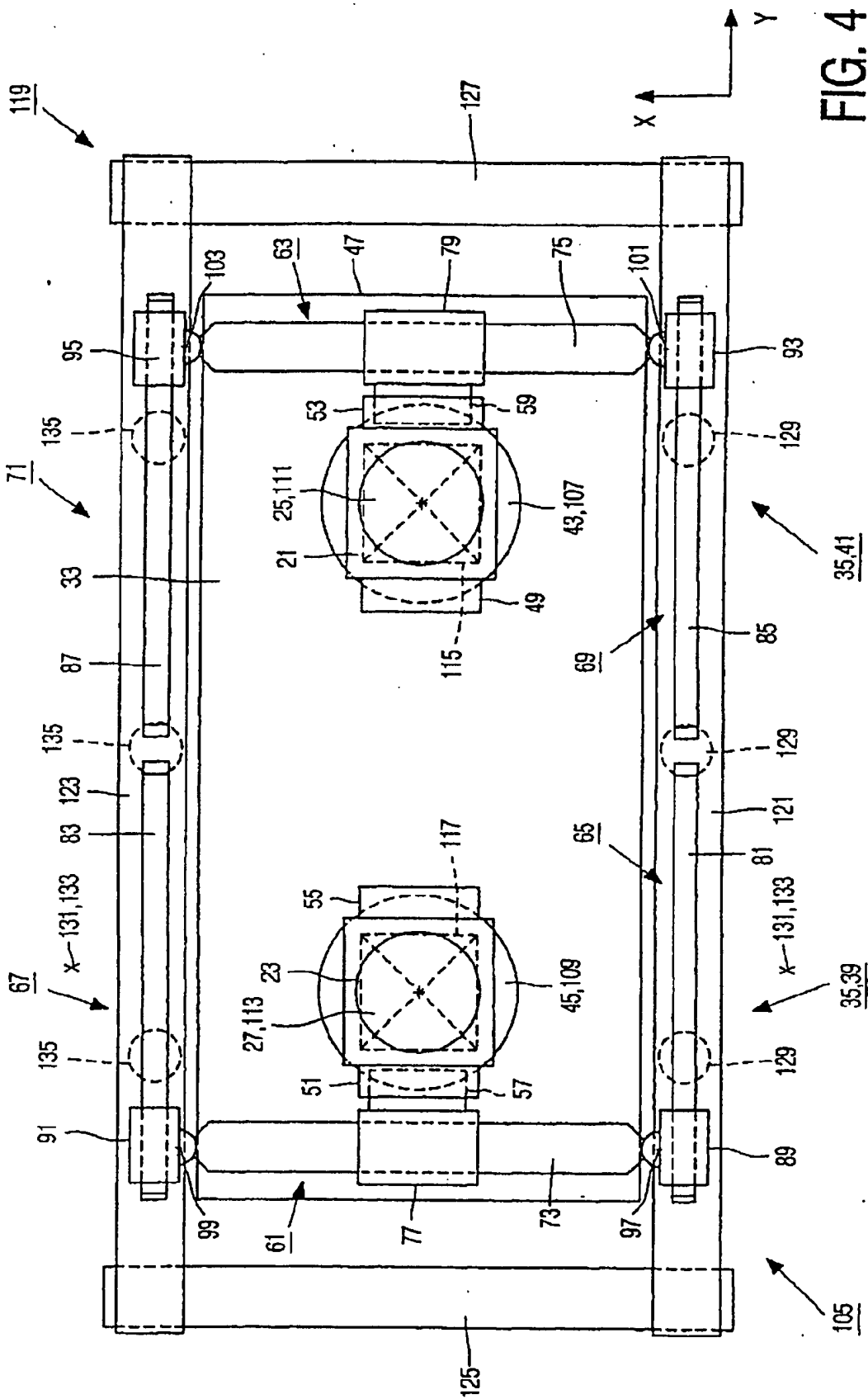
FIG. 2

[Drawing 3]

FIG. 3



[Drawing 4]



[Translation done.]